

There is no question that all amps are not the same. It is very easy to measure large differences in the performance of amplifiers. This is true in nearly every known specification, including power, noise, distortion, etc. My experience has led me to believe that even though these differences can be easily measured, hearing those differences may not be so easy. Given the relatively small magnitude of performance differences, there is a giant step between amplifier performance and our ability to hear performance differences.

It is claimed by designers, manufacturers and especially salespersons that differences in amplifiers are clearly audible. Reasons include "obvious" advantages of one type of circuit topology over another. For example, it is claimed that certain designs have a smoother midrange response whereas other amplifiers exhibit tighter bass. Tube fanatics claim that tube amplifiers have that "warm" sound we all need in our systems.

Such descriptive terms are certainly subject to personal interpretation. It is not my intention to determine if one particular amplifier is better than another amplifier. Differences in the quality of the discrete components and constructions are more appropriate for settling the issue of "good - better - best." The sole purpose of my amplifier challenge is to determine if the differences in amplifiers are audible.

What differences are Audible?

I believe the perceived differences in amplifiers are all due to various factors that can be explained with basic physics and elementary psycho-acoustics. For instance, if two amplifiers are not carefully matched in volume, and one amp is slightly louder than the other, then it would be a simple matter to detect such a difference. In such an example it is important to understand that it is not the circuit topology, quality of the component, design excellence, or superb marketing and packaging that caused the noticeable difference - it was an error in the test setup! It is my present belief that as long as a modern amplifier is operated within its linear range (below overload), the differences between amps are inaudible to the human ear.

Comparing Amps

The idea here is for a test subject to scientifically demonstrate his/her ability to hear differences in amplifiers. It is our job to carefully match the amps so that we are comparing "apples to apples" instead of "oranges to frogs." This means that we sure wouldn't want to compare one amplifier that had + 12 dB of high frequency boost against another amplifier that was adjusted for + 12 dB of bass boost. Such a test would be easy to pass - even on identical amplifiers with consecutive serial numbers.

For our comparison test, we aren't concerned with which amplifier sounds best to the test subject. We only require that the listener be able to identify each amplifier when it is powering the speakers. Since many folks seem to believe that amplifiers have some kind of distinctive sonic character, this test should be easy to pass. Right? After all, we're talking about comparing those harsh sounding, high distortion, squeaky "widget As" to those warm sounding, smooth, bass hog "widget Bs."

Now pay particular attention to the following sections. Since we're looking for differences in amplifiers, and we already know that those differences are probably going to be very, very small, it is important that the parameters under our control be carefully adjusted so as to be equal as possible. This means that we must be cognizant of differences we might unknowingly introduce between amp A and amp B. They must be adjusted as identical as possible. We already mentioned the importance of volume. The same goes for the L and R balance. It sure would be easy to choose an amplifier that exhibited left side bias over a balanced amp. Right?

Well, in order to keep this amplifier comparison test fair, there are a few other parameters that must be considered. I'll list them all in the following section.

Amplifier Comparison Test Conditions

1. Amplifier gain controls - of both channels - are matched to within +/- .05 dB.
2. Speaker wires on both amps are properly wired with respect to polarity. (+ and -)
3. That neither amp has signal phase inversion. If so correction will be made in #2 above.
4. That neither amp is loaded beyond its rated impedance.
5. That all amplifiers with signal processors have those features turned off. This includes bass boost circuits, filters, etc. If frequency tailoring circuits cannot be completely bypassed an equalizer will be inserted in the signal path of one of the amps (only one and the listener can decide which) to compensate for the difference. Compensation will also be made for input and output loading that affects frequency response. Since we are only listening for differences in the sonic signature of circuit topology, the addition of an EQ in only one amp's signal path should make the test even easier.
6. That neither amp exhibits excessive noise (including RFI).
7. That each amp can be properly driven by the test setup. Not normally a problem but it is theoretically a problem.
8. That the L and R channels are not reversed in one amp.
9. That neither amp has excessive physical noise or other indicators that can be observed by the listener.
10. That neither amp has DC OFFSET that causes audible pops when its output is switched.
11. That the channel separation of all amps in the test is at least 30 dB from 20Hz to 20kHz.

In addition to these requirements the test will be conducted according to the following rules.

### Amplifier Test Comparison Rules

1. To make things easy we would prefer to use high quality home type loudspeakers for the test. If our speakers are not acceptable, the listener can provide any commercially available speaker system as long as it uses dynamic drivers. The actual measured impedance cannot exceed the rated load impedance of the amplifiers tested. If, however, the tester would like to perform the test in a car, we will use a car, however, it will have to be provided by the test subject. For practicality we will have to limit the number of amplifier channels to four or less.
2. Amplifiers will be powered from the same power supply at a nominal 14 volts DC. (any voltage is OK as long as it is the same for both amps) see note
3. The test can be conducted at any volume desired; however, the amps will not be allowed to clip. In other words, listening volume can not exceed the power capacity of the smallest amp of the pair being tested. (power capacity will be defined as clipping or 2%THD 20Hz to 10kHz, whichever is less)
4. No test signals can be used - only commercially available music.
5. The test will be conducted "double blind". The listener will control the switcher and can switch between amps as often and at whatever speed he desires. The listener can compare the amps for as long as desired. The listener can repeat any sequence as many times as desired. The listener can review his selections as many times as desired before ending the test. For practical reasons we would like to keep this at least no more than a few hours. A test session will consist of 12 A/B sequences. Passing the test will require a positive identification of each amp for all 12 sequences. Remember, guessing will get you about 6 out of 12. If the differences are so great, and a subject can really hear the difference, then he/she should be able to do so for all 12 sequences.
6. To win the \$10,000.00, the listener must pass two complete sessions of 12 comparisons. Passing the test means 24 correct responses.\* The amp of choice can be compared to the same or a different amp in each session - challengers choice. We have many amplifiers in our demo inventory such as, but not limited to, Alpine, Rockford, Kicker, Phoenix Gold, Precision Power, MTX, Adcom, Kenwood, Pioneer, Sony, etc. You can pick any of them or bring your own.
7. All amps must be brand name, standard production, linear voltage amplifiers. This does not exclude high current amps. Amps can not be modified and must meet factory specs. They must be "car audio amplifiers designed to be powered from a car's electrical system." (see note below)
8. Failure of an amp (this includes thermal shutdown) during the test will require that the test be repeated after repair or replacement or cooling of the amp. This means that the entire test session will have to be repeated.
9. The amps will not be overloaded during the session from either a voltage or current requirement.
10. To save time the listener will have to pass a quick 8 trial session to qualify for the extended 2 session test for the money prize. Any 2 amps can be used for this test. Passing this qualifying test will require at least 6 out of 8 correct answers.
11. The amplifier power up and/or power down sequence will not be acceptable for comparison. (The turn on/off noises of some amplifiers would give it away.)
12. Cost to take the test is \$200.00. \$500.00 for people representing companies. Payable in advance, scheduled appointments only. Done correctly the test takes several hours and I don't have the time if you aren't serious.

\* Twelve correct responses in a row is certainly a lot of correct listening but \$10,000 is also a lot of money for a few hours of easy listening. The way people describe the differences is that they are like night and day. I would certainly not have any trouble choosing between an apple and an orange 12 times in a row. When compared fairly I believe the differences in amps are much too small to audibly detect and certainly too small to pay large sums of extra money for. If I am wrong someone should be able to carefully take this test and win my money. Even if I am right, if enough people take the test eventually someone will take my money due to random chance. This is the reason for the large sample requirement. If you feel that you can easily pass this test but 12 sequences will give you "listening fatigue" I am willing to modify the requirements. Since the way it is being offered is a challenge and only my money is at risk I am willing to let a confident challenger "put his money where his ears are". If we are willing to make this a bet instead of a challenge, I am willing to drop 1 sequence for every thousand dollars put up by the challenger against my money. This would mean:

<u>My</u>		<u>Your</u>		<u>Trails Required to win</u>
\$10,000	to	\$0	=	12 Tries
\$9,000	to	\$1,000	=	11 Tries
\$8,000	to	\$2,000	=	10 Tries
\$7,000	to	\$3,000	=	9 Tries
\$6,000	to	\$4,000	=	8 Tries
\$5,000	to	\$5,000	=	7 Tries
\$4,000	to	\$6,000	=	6 Tries

I will not do the test with less than 6 trails. It would be statistically meaningless and reduce the challenge to mere gambling.

NOTE 1----- from conditions 2 & 7 This test mentions 12v and "car" amps only The test originally began with home/studio type amps and was revised in 1994 for the car audio industry. This version dated 2005 is again expanded to include 120Volt home/studio/commercial type amps.